UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—A statute will be promulgated early next term with the intention of instituting degrees of Doctor of Letters and Doctor of Science. The present statutes provide for the degree of Bachelor of Letters and Bachelor of Science, for which a course of special study or research, and a residence of two years, are required. Several of these research degrees have been granted during the last four years. It is now proposed that the Doctorate should be instituted, for which a candidate shall submit published papers or books containing an original contribution to the advancement of learning or science. A candidate for the degree of Doctor of Science must either be a Bachelor of Science of twenty-six terms standing, or a Master of Arts of thirty-nine terms standing.

The B.Sc. degree has been granted to Mr. H. N. Dickson, of New College; his dissertation consisted of a chemical and physical examination of the surface waters of the North Atlantic collected during 1896 and 1897, and contained 4000 estimations of the salinity.

The lecture list announced for next term contains those to be delivered under the newly instituted School of Geography.

Dr. John Scott Haldane has been reappointed lecturer in physiology for a period of three years.

The newly instituted John Locke scholarship in mental philosophy has not been awarded.

The following alternative subjects are recommended for the Johnson Memorial Prize in 1903: (1) periodic orbits; (2) meteors; (3) an investigation of the image of a star in a telescope as affected by the physical properties of light.

Dr. J. A. H. Murray, editor of the "New English Dictionary," has been appointed Romanes lecturer for 1900.

The annual grant of 300*l.* to the chemistry department of the University Museum has been renewed for five years, and the sum of 170*l.* is to be spent on cases for the Pitt-Rivers Museum.

CAMBRIDGE.—Prof. Marshall Ward has been elected a member of the General Board of Studies.

Mr. Timothy Holmes and Prof. W. Burnside, F.R.S., have been elected Honorary Fellows of Pembroke College.

A Shuttleworth Scholarship in Botany and Comparative Anatomy will be awarded at Caius College in March next. The value is 55*l.* a year for three years, and candidates must be medical students of the university of not less than eight terms' standing. Application is to be made to the senior tutor before March 1.

MR. R. T. GLAZEBROOK'S successor as principal of University College, Liverpool, is Mr. A. W. W. Dale, Fellow and Tutor of Trinity Hall, Cambridge.

SIR WILLIAM C. MACDONALD, of Montreal, has founded a Chair of Geology for McGill University in that city, as a memorial of the late Sir William Dawson. According to the terms of the gift, the income of the endowment will be paid to Lady Dawson during her lifetime, and on her death will become available for the maintenance of the new Chair.

AT University College, London, a course of eight lectures dealing with the methods of spectroscopy especially in connection with the photography of the spectrum will be given on Friday evenings, at 5.30, by Mr. E. C. C. Baly, commencing on January 19, 1900. Among the subjects to be treated and illustrated by experiments are:—The history of the determination of the modern standards of wave lengths; the comparison of spectra and determination of wave lengths visually and photographically with prism apparatus; the determination of wave lengths with the grating; and methods of producing emission and absorption spectra.

A COPY of the special report on the new department of agricultural chemistry of the University College of Wales, Aberystwyth, recently submitted to the Court of Governors, has been received. The work of this promising department of the College is carried on in premises specially designed for the purpose. This accounts for the convenient arrangements for access and inter-communication shown upon the plan which accompanies the report. The rooms and the laboratory fittings give vidence that much care has been taken to design arrangements hich will conserve the energies of the staff, and give facilities for good practical work by the students.

ON Thursday last, upon the occasion of the distribution of prizes and certificates to the successful students of the Goldsmiths' Company's Technical and Recreative Institute, New Cross, Mr Asquith made a few remarks on the work of polytechnic institutes in London. He pointed out that in the metropolitan area, north and south of the Thames, there are no less than eleven institutions of this kind, with four or five subsidiary branches, upon which a capital expenditure of no less than 500,000*l.*, at the least, has been made, with an annual expense to those who promoted them of something like 130,000*l.*, and with an attendance of no less than 50,000 students. The Goldsmiths' Institute is not only one of the most flourishing among London polytechnic institutions, but in some respects it is unique. Unlike every other institution of the kind in London, it does not receive grants of money either from the Technical Board of the London County Council or from the Central Parochial Foundation of the City of London. The whole cost, except the comparatively insignificant sum received from the students' fees, is defrayed out of the funds of the Goldsmiths' Company.

THE *Times* reports that the executive committee of the Agricultural Education Committee has recently passed a series of resolutions including the following:—(1) That, in view of the importance of concentrating the control of agricultural and rural education in the hands of one Government department, it is expedient that all the educational work of the Board of Agriculture should be transferred to the new Board of Education; (2) that the staff of the new Board should include an adequate number of inspectors, well acquainted with the needs of the agricultural classes and the conditions of country life; (3) that the Board's inspectors should be instructed to see that the curricula of rural schools are differentiated from those of urban schools. With regard to training, the committee think that provision should at once be made at certain of the teachers' training colleges for giving those students who desire it practical as well as theoretical instruction in subjects bearing on agriculture and horticulture; and that a special rural teachers' certificate should be awarded to those teachers who have gone through a full course of instruction, practical and scientific, in agricultural subjects. As to higher agricultural instruction, it is suggested that the Board of Education should encourage those county authorities, who have not yet done so, to provide, or to contribute to, school and experimental farms, and should inspect and report annually on such farms; that no more certificates for proficiency in the "principles of agriculture" should be granted to persons who have not completed an adequate course of practical instruction; and that the courses for Schools of Science situate in country districts should be differentiated from those of urban schools of science by substituting instruction in agricultural science and experimental agriculture for that in other subjects. Another resolution suggests that, with a view to interest agricultural societies in the work of agricultural education, they should be supplied with leaflets, reports, &c., to distribute among their members, who should be invited to visit agricultural schools and experimental plots in their neighbourhood, and to discuss them at their meetings.

SOCIETIES AND ACADEMIES.

LONDON.

Physical Society, December 8.—Prof. G. Carey Foster, F.R.S., Vice-President, in the chair.—Prof. S. P. Thompson read a paper on obliquely crossed cylindrical lenses. Any two cylindrical lenses crossed obliquely are optically equivalent to two other cylindrical lenses crossed rectangularly, and hence to a sphero-cylindrical lens. Owing to the difficulty of manufacturing cylindrical lenses with the axes of the opposite faces in different directions, it becomes of importance to the optician to be able to calculate the constants of the equivalent but more easily ground sphero-cylindrical lens. To a first approximation a surface of radius of curvature "r" will impress upon a plane wave a curvature of $\frac{\mu - 1}{r}$ where "μ" is the refractive index of the material. If we suppose an equiconvex cylindrical lens cut by two planes at right angles, the line of intersection of the planes passing normally through the centre of the lens, then the sections of the lens will in general be portions of ellipses. It is possible, therefore, to write down in terms of the angle which one of these planes makes with the axis, the convergivity which would be impressed by the lens upon plane waves travelling in these planes. The effect of a second lens crossing the first obliquely can also be written down with respect to the same two planes. The joint effect of the two lenses can then be resolved along any two lines at right angles. Differentiating the expressions for these effects and equating to zero, we get the directions of maximum and minimum cylindricity. These directions are at right angles, and represent two lenses crossed rectangularly, which are the optical equivalent of the original pair considered. The sphero-cylindrical lens is then easily obtained. From the mathematical expressions Prof. Thompson has deduced a graphical solution of the problem. The author exhibited a convenient combination of two cylindrical lenses for giving varying degrees of cylindricity. Let two lenses be ground, each being a mixed equi-cylinder consisting of a concave and convex ground at right angles to one another on the opposite faces of the glass. Two such mixed cylinders, if rotated with equal motion in opposite directions, will give a varying cylindricity of fixed direction in space. With the axes of positive cylindricity coincident they give the maximum; but when each is rotated 45°, their resultant is zero. When rotated beyond 45°, the resultant axis of cylindricity is negative in the fixed direction in which it was formerly positive.—Mr. T. H. Blakesley read a paper on exact formulæ for lenses. In this paper the author makes use of the definition of focal length with respect to magnifying power, which he has described in the *Proceedings* of the Physical Society for November 1897. By this method the focal length of a lens combination is simply a line and not the distance between two definite points. Following the methods of his previous paper, Mr. Blakesley showed how it was possible to determine accurately the constants of lens combinations, and pointed out practical applications to the racking of telescopes for camera work, the determination of refractive indices of liquids, &c.—Prof. W. E. Dalby exhibited a friction dynamometer. The torque to be measured produces a twist in a spiral spring, and the object is to determine the amount of this twist. Side by side upon the shaft are two pulleys, one keyed to the shaft and the other fastened to the end of the spring. The lead of one pulley upon the other, therefore, measures the twist. Two other pulleys are mounted upon a slide, and are joined up to the first ones by means of a continuous band similar to a Weston's differential pulley block. When the shaft is at rest, the two pulleys on the slide are touching; but any motion of the shaft produces a twist in the spring, and therefore a lead of one of the shaft pulleys on the other. This produces a separation of the slide pulleys, which is proportional to the lead, and therefore to the torque, and so from a knowledge of the constants of the dynamometer and its number of revolutions per second the power transmitted is at once determined.—Prof. S. P. Thompson read a note on an organic compound of great double refraction. This substance is crystallised naphthaline, and it is 60 per cent. more doubly refracting than Iceland spar. It is exceedingly brittle, and therefore difficult to work into prisms. Any worked surface must be at once covered with glass to prevent sublimation.—The Society then adjourned until January 26, 1900.

Zoological Society, November 28.—Dr. Henry Woodward, F.R.S., Vice-President, in the chair.—Mr. Lydekker exhibited (on behalf of Messrs. Rowland Ward, Ltd.) and remarked on a headless skin of a kob-like antelope from Lake Mweru, which he proposed to call *Cobus smithemani*, after its discoverer, Mr. F. Smitheman. He likewise exhibited the skull and horns of another kob, belonging to Sir E. G. Loder, for which the name *C. vardoni loderi* was suggested.—Mr. Oldfield Thomas exhibited the skull of a baboon recently obtained at Aden by Messrs. Percival and Dodson. It appeared to represent a new species allied to *Papio hamadryas*, but distinguished by its small size, the row of upper cheek-teeth being only 41·5 mm. in length. It was proposed to be named *Papio arabicus*.—Mr. W. Saville-Kent exhibited, with the aid of the lantern, a series of slides demonstrating the utility of trichromatic photography as applied to the correct colour-registration of biological subjects. Photographic transparencies representing various species of plants and animals were included in the series.—Mr. J. S. Budgett gave a general account, illustrated with lantern-slides, of his recent expedition to the Gambia Colony and Protectorate, undertaken primarily for the study of the habits of *Polypterus*. Some living and spirit specimens of this fish were exhibited, and remarks were made upon it, as also upon *Protopterus*, of which examples were likewise obtained. Special reference was made to the antelopes met with during a trip up the Gambia River to the end of its navigable waters, and specimens of the heads of those obtained were laid on the table. A collection of Gambian birds was also exhibited.—A communication was read from Mr. L. A. Borradaile, in which it was shown that both genera (*Coenobita* and *Birgus*) of the Pagurine land-crabs (*Coenobitidae*) are hatched in the *Zoaea*-stage.—Dr. W. G. Ridewood read a paper on the relations of the efferent branchial blood-vessels to the *circulus cephalicus* in the Teleostean fishes, based upon an examination of specimens of sixty-one species. He demonstrated the great variation that is met with in the arrangement of the efferent vessels, and discussed the possibility of utilising the characters as a means of arriving at a natural classification of the group.—Mr. G. A. Boulenger, F.R.S., read a paper on the reptiles, batrachians and fishes collected by the late Mr. John Whitehead in the interior of Hainan. The collection contained specimens of fifteen species, embracing four species of reptiles, six of batrachians, and five of fishes. Of these, two species of reptiles, three of batrachians, and three of fishes were described as new.—A communication was read from Dr. A. G. Butler on a collection of butterflies made by Mr. Richard Crawshay in British East Africa. Sixty-eight species were enumerated and remarked upon, of which four were described as new.—A second communication from Dr. Butler contained a list of a small collection of butterflies made by Captain Hobart, of the Grenadier Guards, in the Nandi District of the Uganda Protectorate. Of the seventeen species represented in the collection, one (*Cymothoe hobarti*) was described as new.—A communication was read from Mr. J. Y. Johnson, containing a note on the habit and mode of growth of the corals belonging to the genus *Pleurocorallium*.—Mr. W. E. de Winton made some supplementary remarks to those published in the *Proceedings* for 1898 (p. 900), on the moulting of the King Penguin (*Aptenodytes pennanti*) now living in the Society's Gardens.

Entomological Society, November 15.—Mr. G. H. Verrall, President, in the chair.—The President announced the death of Dr. C. G. Thomson, one of the honorary fellows of the Society.—Mr. J. J. Walker exhibited four examples of a species of Curculionidæ—*Cleonus sulcirostris*, taken on red sandy soil at Barr's Hill, near Oxford. These examples, he pointed out, were of a reddish tint, harmonising with the colour of the soil on which they were found, and in marked contrast to that of normal grey specimens, some of which, taken at Deal and Reading, he showed for comparison.—The President exhibited specimens of *Chersodromia hirta*, which were found under sea-weed at Brora in August 1899.—Mr. G. W. Kirkaldy exhibited two species of Hemiptera of economic interest, one a Pyrrochorid—*Dysdercus cingulatus* (Fabr.), sent by Mr. E. E. Green from Ceylon, where it was found appearing in abundance on the cotton plants, the other a Psyllid—*Aleyrodicus dugesii* Cockl., forwarded by M. A Dugès, who stated that it is attacking the white mulberries in Mexico.—Mr. J. H. Leech contributed part iii. of his paper on Lepidoptera Heterocera from Northern China, Japan, and Corea.

CAMBRIDGE.

Philosophical Society, November 13.—Mr. Larmor, President, in the chair.—Intumescences on *Hibiscus vitifolius*, by Miss E. Dale. *Hibiscus vitifolius* is a plant which is common in the hotter parts of Asia, Africa and Australia. It is usually very hairy, but the hairiness is subject to considerable variation, and the hairs are of several different kinds. On plants grown in greenhouses there are formed abnormal outgrowths of the epidermal and the subepidermal tissue of the stems and leaves. These emergences, especially on the leaves, usually bear stomata at their apices, and those on the stem are characterised by the formation of a cork-cambium at the base of each, which cuts off the older outgrowths. No traces of fungi or mites have been found, but experiments show that these outgrowths are not formed on plants in the open, where transpiration is more freely promoted. Seedlings and cuttings from such plants devoid of outgrowths, when placed in a greenhouse, develop outgrowths, while seedlings from plants provided with them, and which themselves have developed them, lose them if transferred to the open. It seems therefore probable that growth under glass may promote the production of some actively osmotic body in the young cells, and that the over-turgescence is expressed in the abnormal protrusions. Hence the application of the name "Intumescences."—Note on the name *Balanoglossus*, by Dr. Harmer. It was suggested that the species which belong to *Balanoglossus* as restricted by Spengel should be placed in a new genus *Balanocephalus*, whose type-species would be *B. kupfferi*. *Balanoglossus* should be dropped as a generic name, but may conveniently be retained as a semi-popular designation in cases where it is not desired to restrict a statement to any particular genus of the Enteropneusta.—The skeleton of *Astrosclera* compared with that of the Pharetronid sponges, by J. J. Lister. The structure of *Astrosclera willeyana*, the representative of a new family of sponges, obtained by Dr. Willey in the Loyalty Islands, was described, and attention was drawn to the resemblance between its skeleton and that of some members of the *Pharetrones*, a group of sponges which are found as fossils in formations ranging from the Carboniferous to the Cretaceous period. It was pointed out that the resemblance between the skeletal elements formed within the living protoplasm of *Astrosclera* and the bodies formed by purely physical processes in the St. Cassian fossils may have a bearing on the problem of the mode of origin of sponge spicules.—Note on hypotheses as to the origin of the paired limbs of Vertebrates, by J. Graham Kerr. In a paper on hypotheses as to the origin of the paired limbs of Vertebrates, which was taken as read, Mr. J. Graham Kerr referred first to the two hypotheses which were predominant at the present time as explaining the origin of the paired limbs—that which derives them from portions of a once continuous lateral finfold, and that which derives them from the septa between adjacent gill-clefts. The first portion of the paper consisted of a brief statement of these two views together with the fundamental facts upon which they rest, followed by a critical examination of them in the light of modern research. The author came to the conclusion that both views must be looked upon rather as suggestive hypotheses than as scientific theories of the facts as at present known to us. He therefore ventured to bring forward a third view, confessedly a mere hypothesis, which seemed to him to have received very inadequate attention—that the paired limbs are homodynamous with the somatic or true external gills.—Observations upon Polypterus and Protopterus, by J. S. Budgett. Two distinct species of Polypterus occur in the Gambia, *Polypterus lapradii* and *Polypterus senegalus*; the latter was observed in captivity and also in the wild state. The pectoral fins are distinctly organs of propulsion and not as in Teleosts almost exclusively balancers. Polypteros uses its bilobed air bladder as a lung, and can survive an exposure to a damp atmosphere of twenty-four hours. The spiracle is used to emit the excess of air in the pharynx but not for the passage of water. Both species migrate from the river to the flooded meadows in June and July and, spawning in August and September, return to the river in October and November.

EDINBURGH.

Royal Society, December 4.—Lord Kelvin in the chair. As usual at the first meeting of the session, the President gave a brief sketch of the work accomplished last session. Lord Kelvin then proceeded to discuss two physical problems, namely, the problem of the spinning top, and the question as to the manner in which ether is affected by the motion through it of attracting and repelling points. Many mathematicians of the highest order had attacked the problem of the rotation of a rigid body of which one point is fixed; but the peculiarity of the spinning top was that no point was fixed until it settled into the so-called "sleeping" condition. Mr. Archibald Smith, in a paper published in the first volume of the *Cambridge Math. Journ.* (1837), seems to have been the first to have correctly considered the question, Why does a spinning top rise to the sleeping state and then fall away again? And no later mathematician seems to have taken up this question at all. Lord Kelvin had recently worked out a simple case in which the centre of gravity was constrained to move in a vertical line. The minimum angular velocity, for which the upright "sleeping" motion was stable, depended in a simple way upon the curvature of the assumed hemispherical apex on which the top spun. The second problem was a fresh attempt to reconcile the apparently opposite properties of ether which render it so mobile to mass motions through it and yet so sensitive to rapid molecular vibrations. Briefly stated, the idea was to have an intermediate link between the molecule and ether in the form of a "doublet feeler." This doublet consisted of repelling and attracting points, which produced appropriate strains in the ether when themselves set in vibration by the vibrating molecule. The idea, however, gave no clue as to the nature of electricity and magnetism.—In a paper on the rectal gland of the Elasmobranchs, Dr. J. Crawford gave an account of an investigation into the structure and function of this appendage in the dog-fish and skate. The evidence was in favour of its being an excretory organ of the nature of a kidney.—An obituary notice of Dr. Charles Hayes Higgins, prepared by Dr. Sydney Marsden, was read.—Dr. Noel Paton gave an account of further investigations of the life history of the salmon in fresh water. This second instalment dealt chiefly with the fish taken in the months February, March and April, and the general conclusions agreed with those already drawn, the chief result being that the migration of the salmon is regulated wholly by the question of nutrition. The comparative scarcity of male fish caught prevented any certain conclusions being drawn in regard to them. From a comparative study of the pigments Miss Newbiggin had collected strong evidence in favour of Sir John Murray's view that the colour of the salmon was derived from the pigments in the Crustacea, which supplied directly or indirectly the chief food for these fish.—Dr. Thomas Muir communicated a paper on the eliminant of a set of general ternary quadrics, Part ii.

Mathematical Society, December 8.—Mr. R. F. Muirhead, President, in the chair. The following papers were read:—On the evaluation of a certain determinant, by Prof. Crawford.—A special case of the dissection of any two triangles into mutually similar pairs of triangles, by Mr. Alex. D. Russell.—Elementary proof of the potential theorems regarding uniform spherical shells, by Dr. Peddie.

PARIS.

Academy of Sciences, December 4.—M. van Tieghem in the chair. Justification of Fermat's principle on the economy of time in the transmission of a luminous movement through a heterogeneous transparent isotropic medium, by M. J. Boussinesq. Researches on the phenomena of phosphorescence produced by the radiation of radium, by M. Henri Becquerel. The rays given off by some milligrams of barium chloride containing radium were allowed to fall upon various substances, such as calcium and strontium sulphides, rubies, diamond, calc spar, fluorite, and hexagonal blende, in a Becquerel phosphoroscope. When placed first in the dark, and then brought up to within a few millimetres of the radiating substance, all those minerals which became luminous under the influence of the X-rays, also became luminous under the radium rays; but ruby and calc spar, which only become phosphorescent under luminous rays, remained dark. There are, however, differences between the X-rays and these new radiations. Thus a specimen of diamond which was brilliantly luminous under the action of radium did not become luminous when exposed to the radiation from a focus tube, and similar differences were noted for other substances. The whole of the facts observed show that there is really a continuous giving out of energy by radio-active bodies. —On the metallic compound radicals: mercury derivatives, by M. Berthélot. Measurements of the heat of combustion and formation of mercury-methyl, mercury-ethyl, and mercury-phenyl.—Lactic acid, by MM. Berthélot and Delépine. A thermochemical study of lactic acid, and lactones derived from it.—On the explosion of potassium chlorate, by M. Berthélot. If potassium chlorate is introduced suddenly into a vessel which has been previously heated to a temperature much above that at which decomposition commences, an explosion takes place, as with picric acid under similar conditions, although under a slow heating potassium chlorate shows no explosive properties. The explosion produced is clear and sharp, although a little prolonged, resembling a slow powder. These facts give a probable explanation of the recent explosion of chlorate at St. Helens.—On the normal existence of arsenic in animals, and its localisation in certain organs, by M. Armand Gautier. From a consideration of the use of arsenical compounds as a specific in certain diseases, especially in anæmia and Basedow's disease, the author came to the conclusion that the activity of arsenic in such diseases must be to its forming a constituent part of some organs, more particularly the thyroid gland. A search for arsenic showed that it is present as a normal constituent of the thyroid gland in weighable amounts in herbivora, carnivora, and in man. It is also present in smaller quantities in some other organs. In the normal state, there would appear to be about 1 milligram of arsenic in 127 grams of thyroid gland. Further research showed that if the gland is slowly digested at 38° in presence of acidulated pepsine solution, the peptone formed contained no arsenic, the whole being concentrated in the residue of cellular nuclei.—Research and estimation of minimal quantities of arsenic in the organs, by M. Armand Gautier. The tissues are warmed with pure nitric acid (containing about one per cent. of sulphuric acid) until the whole is liquefied, then strong sulphuric acid is added and heat again applied, the oxidation being completed by the addition of nitric acid in small quantities. The liquid is diluted largely with water, sulphurous acid added, and hydrogen sulphide passed for some hours. After purification, the arsenic sulphide is oxidised and poured into a Marsh's apparatus.—M. Georges Lemoine was elected a Member in the Section of Chemistry in the place of the late M. Friedel.—Particulars of a destructive earthquake in the Moluccas on September 30, by the French Consul at Batavia.—Remarks by M. Lœwy on the "Annales de l'Observatoire de Toulouse."—Observations of the Leonids and Biélids made at Athens, November 1899, by M. D. Éginitis.—On some properties of certain systems of circles and spheres, by M. C. Guichard.—On the theory of groups, by M. R. Baire.—On differential equations of the second order with fixed critical points, by M. Paul Painlevé.—Generalisation of a formula of Gauss, by M. E. Busche.—On the transformation of Abelian functions, by M. G. Humbert.—Influence of the X-rays upon the electrical resistance of selenium, by M. Perreau. The X-rays were found to reduce the resistance of selenium in a similar manner to light rays, the reduction caused by the Chabaud tube used being nearly the same as that caused by diffused daylight, or a gas flame at 1·5 metres.—On the proof of the fluorescence of aluminium and magnesium in water and in alcohol under the action of the currents from an induction coil, by M. Thomas Tommasina.—Dissociation of potassium and ammonium iodomercurates by water, by M. Maurice Francois. The decomposition of $(NH_4)I.HgI_2.H_2O$ and of $KI.HgI_2.5H_2O$ is a limited one, and is reversible. When the state of equilibrium is attained, the amount of alkaline iodide present in the liquid is constant for a given temperature.—On the heats of partial neutralisation of carbonyl-ferrocyanic acid compared with those of ferrocyanic acid, by M. J. A. Muller. Carbonyl-ferrocyanic and ferrocyanic acids are of the same order of strength.—On some new combinations of benzene with phosphoric anhydride, by M. H. Giran.—Preparation of tetrachloro- and tetrabromo-orthoquinones starting from the corresponding tetrahaloid derivatives of guiacol and veratrol, by M. H. Cousin. The tetrachloro-derivatives of guiacol and veratrol are first hydrolysed by nitric acid, and the resulting pyrocatechols oxidised to the corresponding quinones.—On a case of hysterical hemiplegia cured by hypnotic suggestion and studied by chronophotography, by M. G. Marinesco.—Biological observations on *Peripatus capensis*, by M. E. L. Bouvier.—On the hybrid fertilisation of the albumen, by M. Hugo de Vries.—The Cretaceous minerals of Aquitaine, by M. Ph. Glangeaud.—On the history of the Jiu valley, in the Central Carpathians, by M. E. de Martonne.—On the vestiges of an ancient vitrified stronghold in the upper valley of the Dore (Puy-de-Dôme), by M. J. Uselade.

NEW SOUTH WALES.

Royal Society, September 6.—The President, W. M. Hamlet, in the chair.—"Sailing birds are dependent on wave-power," by L. Hargrave. The author points out that sailing birds passed most of their time over the face or rising side of waves, and that by so doing they abstracted power from the moving water as the progress of the wave raised the air above it at a velocity proportional to its speed and slope. He used Prof. S. P. Langley's results to show that the uplift of a moderate swell was amply sufficient to support a plane and keep it moving at about thirty-five miles per hour in a calm.—"Some applications and developments of the prismoidal formula," by G. H. Knibbs. Starting with a demonstration that the prismoidal formula was rigorously applicable to solids with parallel plane ends, whose mantles were ruled surfaces, the paper showed how the volumes of series of longitudinally contiguous solids, with plane ends, and skew or warped—ruled quadric—surfaces on the other sides, could most conveniently be calculated. The determination of the volumes of solids whose longitudinal axes were plane-curves, or curves of double curvature, was also considered, and it was shown that the prismoidal formula was also rigorously applicable to circularly warped solids, the centre of gravity in such changing its position linearly with the distance along the curved longitudinal axis. When the change of the centre of gravity of a right section is a non-linear function of the distance along the curved axis, or when the radius of curvature is not constant, the prismoidal formula is not rigorously applicable. The paper closed with suggestions as to the application of the formulæ.—Among the exhibits were twenty-four mounted photographs, including a series of photographs of aboriginals representing two types, male and female, a few illustrative of camp life and corroborees, and a special series illustrating some of the details of an aboriginal Bora ceremony. The photographs were taken and exhibited by Mr. Chas. H. Kerry, and afterwards presented to the Society.

Royal Society, October 4.—Prof. T. W. E. David, Vice-President, in the chair.—Current Papers, No. 4, by H. C. Russell, C.M.G., F.R.S. This paper began by calling attention to the fact that during the years 1896 and 1897 the prevalent winds over Australia and the Indian Ocean were north-west, and that as a result, comparatively few current papers were received, because the wind forced the bottles carrying current papers towards the south, and in this way prevented them from resting in the Australian Bight, the great dumping ground for bottles. It was also shown that during the past year north-west winds had been few and light, while southerly winds had been frequent, and, as a consequence, current papers had been frequently received. On many days they came in pairs, and on one day three current papers had been seen, which is the maximum for one day, and during the past year 105 had been received. Referring to the drift of the disabled steamer *Perthshire*, it was shown that the direction the steamer took was just that which the author had found to be the course of bottle-papers, and that although the *Perthshire* was driven by many winds, it would appear that the final result did not produce any deviation from the drift-line of that part of the Tasman Sea. Reference was made to the unusual number of breaks in propeller shafts, and to the greater speed of current papers and the great number of violent storms, which the author thought all pointed to unusual energy in the sea and atmosphere, which may have caused the unusual strains on propeller shafts.—Note on the occurrence of Glaciated Pebbles in the Permo-Carboniferous Coal-field near Lochinvar, New South Wales, by Prof. T. W. E. David. These glaciated pebbles occur on a geological horizon over 1000 feet below the level of the Greta Coal-seams, whereas the horizons, where Mr. W. G. Woolnough and Mr. R. D. Oldham discovered their glacial pebbles, are from 1500 to about 2000 feet above the level of the Greta Coal-seams. These glacial beds at Lochinvar are at the very base of the Permo-Carboniferous System, and in general appearance closely resemble the Bacchus Marsh Glacial beds of Victoria, a locality where there is evidence of ice action on a grand scale over a wide area. These last belong probably to about the same geological age as the beds near Lochinvar. The height of the glacial beds at Lochinvar is about 200 feet above the sea, and the thickness of the beds probably not less than 200 feet. The pebbles were probably transported by floating ice. Those at Lochinvar were carried to their present resting place before the Greta Coal-seams were formed, and those at Branxton some time subsequent to the formation of the Greta Coal, in either case at times when this part of the Hunter Coal-field was submerged under the sea, as marine shells of Permo-Carboniferous age occur immediately above the glacial beds.

AMSTERDAM.

Royal Academy of Sciences, October 28.—Prof. Stokvis in the chair.—Prof. Martin reported on behalf of Prof. Behrens and himself on a treatise by Mr. Fritz Noetling, entitled "The miocene of Burma." The conclusion of this report was adopted, viz. to insert this treatise in the *Transactions* of the Academy.—Mr. H. E. de Bruyn read a paper on the relation between the mean sea level and the height of half tide. The author proved that various causes, such as (1) the height of the flood tide, (2) the average sea level, (3) the time of year, (4) the presence of drift ice, influence the difference between the above two averages, and he determined the amount of this influence in the case of the sea level at Delfzÿl.—Prof. Bakhuis Roozeboom presented Dr. H. J. Hissink's dissertation, entitled "On mixed crystals of sodium nitrate with potassium nitrate and of sodium nitrate with silver nitrate," and made a communication on the subject. He also read a paper on the nature of inactive carvoxime.—Prof. Behrens read a paper on Isomorphous compounds of gold and mercury. The following communications were presented for insertion in the *Proceedings*: by Prof. Kamerlingh Onnes, on behalf of Dr. E. van Everdingen, jun., a paper on the Hall effect and the increase of magnetic resistance in bismuth at very low temperatures; by Prof. Van der Waals, a paper of Dr. G. Bakker, entitled "Observations on Van der Waals' molecular potential function"; by Dr. J. P. Van der Stok, a paper on tidal constants in the Lampong and Sabangbay; by Prof. Jan de Vries, a paper by Prof. L. Gegenbauer of Vienna, entitled "Neue Sätze über die Wurzeln der Functionen $C_n^\nu(x)$.

GÖTTINGEN.

Royal Society of Sciences.—The *Nachrichten* (Mathematico-physical Section), Part 2, contains the following memoirs contributed to the Society:—

March 11.—Eduard Riecke: Free electricity on the surface of Crookes' tubes.

May 6.—H. T. Simon: The law of action of the Wehnelt interruptor; and on rapid spark-discharges.

May 13.—O. Wallach: Researches (vii.) from the University Chemical Laboratory. (1) On substituted cyanamides and thiocarbamides. (2) On phenyl- and tolyl-butyric acid. (3) Conversion of pentacyclic into azotised hexacyclic compounds. (4) On mixed diazoamido-compounds.—H. Liebmann: Proof of two theorems on the determination of "ovaloids" by the measure of curvature or the mean curvature for all normal directions.

June 24.—J. Orth: Researches from the Göttingen Pathological Institute.

July 22.—Eduard Riecke: On the pressure within certain radiometers.—A. Schönflies: On the distribution of stationary and non-stationary points in certain functions of a real variable.—E. Wiechert: Seismometric observations in the Göttingen Geophysical Institute.

August 13.—O. Wallach: Researches (viii.) from the University Chemical Laboratory. (1) On the oxidation of pinene. (2) On compounds of the fenchone-series. (3) Condensation products from hydro-rubeane, aldehydes and secondary bases.

August 28.—C. Hartlaub: Preliminary communication on the genera *Margelopsis* and *Nemopsis*.

DIARY OF SOCIETIES.

THURSDAY, December 14.

Royal Society, at 4.30.—The Piscian Stars: Sir Norman Lockyer, K.C.B., F.R.S.—On the Origin of certain Unknown Lines in the Spectra of Stars of the β Crucis Type, and on the Spectrum of Silicon: Joseph Lunt.—A Note on the Electrical Resistivity of Electrolytic Nickel: Prof. J. A. Fleming, F.R.S.—Investigations on Platinum Thermometry at Kew Observatory: Dr. C. Chree, F.R.S.—Observations on the Morphology of the Blastomycetes found in Carcinomata: Dr. K. W. Monsarrat.

Society of Arts, at 4.30.—Round about the Andamans and Nicobars: Colonel R. C. Temple.

Mathematical Society, at 8.—Sums of Greatest Integers: G. B. Mathews, F.R.S.—Note on Circular Cubics: A. B. Basset, F.R.S.—Formulæ involving Central Differences; and their Application to the Calculation and Extension of Mathematical Tables: W. F. Sheppard.—On the Expression of Spherical Harmonics as Fractional Differential Coefficients: J. Rose-Innes.—The Genesis of the Double Gamma Functions: E. W. Barnes.—The Theorem of Residuation, being a General Treatment of the Intersections of Plane Curves at Multiple Points: Dr. F. S. Macaulay.

Institution of Electrical Engineers, at 8.—Discussion on Mr. Crompton's and Mr. John Holloway's Papers.—Electrical Time Service: F. Hope-Jones.

FRIDAY, December 15.

Epidemiological Society, at 8.30.—Precautions against Plague and Cholera at the Quarantine Station at El Tor: Dr. Armand Ruffer.—The Behaviour of Plague at Oporto: Dr. Arthur Shadwell.—The Control of Plague in India by the Medical Inspection of Railway Passengers: Dr. Spencer Low.

Institution of Civil Engineers, at 8.—On Sludge: Blamey Stevens.

MONDAY, December 18.

Royal Statistical Society, at 5.30—Some Notes on Makeham's Formula for the Force of Mortality: H. P. Calderon.

TUESDAY, December 19.

Zoological Society, at 8.30.—General Remarks on the Mammal-fauna of South Africa: W. L. Sclater.—Contributions to the Osteology of Birds. Part IV. Pygopodes: W. P. Pycraft.—On the Myology of the Edentata, Part II.: B. C. A. Windle and F. G. Parsons.

Institution of Civil Engineers, at 8.—*Paper to be further discussed*: Combined Refuse-destructors and Power-plants: C. Newton Russell.——*Papers to be read, time permitting*: The Purification of Water after its Use in Manufactories: Reginald A. Tatton.—Experiments on the Purification of Waste-Water from Factories: W. O. E. Meade-King.

Royal Statistical Society, at 5.—Some Statistics relating to Working-Class Progress since 1860: G. H. Wood.

Royal Photographic Society, at 8.—Negatives for Three-colour Work: Captain W. de W. Abney, C.B., F.R.S.

WEDNESDAY, December 20.

Society of Arts, at 8.—Bi-Manual Training by Blackboard Drawing: H. Bloomfield Bare.

Geological Society, at 8.—On some Effects of Earth-Movements in the Carboniferous Volcanic Rocks of the Isle of Man: G. W. Lamplugh.—The Zonal Classification of the Wenlock Shales of the Welsh Borderland: Miss G. L. Elles.—On an Intrusion of Diabase into Permo-Carboniferous Rocks at Frederick Henry Bay (Tasmania): T. Stephens.

Royal Meteorological Society, at 7.30.—The Climatic Conditions necessary for the Propagation and Spread of Plague: Baldwin Latham.—Note on a Remarkable Dust Haze experienced at Teneriffe, Canary Islands, February, 1898: Dr. Robert H. Scott, F.R.S.

Royal Microscopical Society, at 8.—A Review of Photo-micrography, and its Different Methods: Edmund J. Spitta.

THURSDAY, December 21.

Linnean Society, at 8.—The Air-bladder and its Connection with the Auditory Organ in the Notopteridæ: Prof. Thos. W. Bridge.—On some New and Interesting Foraminifera from the Funafuti Atol, Ellice Islands: F. Chapman.

Chemical Society, at 8.—The Condensation of Glycollic Aldehyde and Formation of α and β Acrose: H. Jackson.—On Brasilin and Hæmatoxylin, Part III. A. W. Gilbody and W. H. Perkin, jun.—The Action of Alcoholic Potash on Monobromoglutaric Ester: N. E. Bowtell and W. H. Perkin, jun.—(1) Mercurous Iodide; (2) On the Interaction of Mercurous Nitrite and Ethyl Iodide: Dr. P. C. Râу.

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